

AIR SAMPLING USING THE HIGH VOLUME SAMPLERS

Purpose

This Meteorology and Air Quality Group (MAQ) procedure describes the steps to operate the CF-1000BRL High Flow sampler, the Hi-Q HVP-3000BRL TSP sampler, Anderson GV-2360 sampler, and similar samplers used for collecting TSP samples from air for the AIRNET or special projects.

Scope

This procedure applies to the individuals assigned to operate and maintain the air samplers used for collecting TSP samples from air for the AIRNET or special projects.

In this procedure

This procedure addresses the following major topics:

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Hazard Control Plan

The hazard evaluation associated with this work is documented in Attachment 1: Initial risk = **low**. Residual risk = **low**. Work permits required: none. First authorization review date is one year from group leader signature below; subsequent authorizations are on file in group office.

Signatures

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CONTROLLED DOCUMENT

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General information about this procedure

Attachments This procedure has the following attachments:

Number	Attachment Title	No. of pages
1	Hazard Control Plan	2

History of revision

This table lists the revision history and effective dates of this procedure.

Revision	Date	Description Of Changes
0	2/20/01	New document.
1	12/1/03	Update descriptions and process steps, add steps to require marking of extension cords that power samplers.

Who requires training to this procedure?

The following personnel require training before implementing this procedure:

- Personnel assigned to operate and change samples on the CF-1000BRL sampler.

Training method

The training method for this procedure is **on-the-job** training by a previously trained individual and is documented in accordance with the procedure for training (MAQ-024).

Prerequisites

In addition to training to this procedure, the following training is also required prior to performing this procedure:

- First Aid
- Cardiopulmonary Resuscitation (CPR)
- Field Survival
- MAQ-202, "Environmental Sampling of Ambient Airborne Radionuclides"
- MAQ-207, "Evaluation of AIRNET Sampler Sites Against Siting Criteria" (if determining sampler location)

General information, continued

**Definitions
specific to this
procedure**

None.

References

The following documents are referenced in this procedure:

- MAQ-024, “Personnel Training”
- MAQ-202, “Environmental Sampling of Ambient Airborne Radionuclides”
- MAQ-207, “Evaluation of AIRNET Sampler Sites Against Siting Criteria”
- Operating Manual for CF-1000BRL High Volume Sampler

Note

Actions specified within this procedure, unless preceded with “should” or “may,” are to be considered mandatory guidance (i.e., “shall”).

Worker Safety

Performing work safely

DO NOT perform work under conditions you consider unsafe. Before beginning work described in this procedure, review safety needs and requirements, identify hazards, and develop hazard mitigation measures. Be aware that facility configurations and hazards may change between visits. Hazards to assess include, but are not limited to the following:

Facility management units - Work control is the responsibility of the Facility Manager in whose area one may want to locate a sampler. Obtain approval from facility management before beginning work to locate a monitor in a Facility Management Unit. Facility management must also have knowledge of your presence and activity during subsequent normal operations. Ensure you have completed all facility-specific training requirements.

Contact your supervisor and the project leader if working conditions are found to be unsafe.

Setting up the sampler

Description of system The CF-1000BRL high flow sampler is portable, maintenance-free, High Volume Air Sampling System and can be used for continuous or intermittent sampling. The 110VAC powered sampler will pull air at any rate up to 50 CFM. The particles can be collected on most any desired filter media. The AIRNET project uses polypropylene filter media (same as used to collect AIRNET samples according to MAQ-202) and samples at a rate of 40 cfm. The CF-1000 comes standard with a 4" diameter filter holder. The sampler can be adapted from the 4" diameter ring to an 8" x 10" holder by simply threading on a (HI-Q model #) CFPH-810.

Anderson GV-2360 volumetric flow controlled units

Siting the sampler The sampler will generally be used in remote areas where a generator will provide power if utility power is not available. The **Air Quality Monitoring Project Leader** will determine the location.

Guidance for siting the station is provided in MAQ-207 ("Evaluation of AIRNET Sampler Sites Against Siting Criteria").

Use a GPS unit to collect site location coordinates.

Enter special studies info and get c-of-c form Ensure the data about the sampling event is entered into the AIRNET Access database under Special Studies. Obtain the chain-of-custody form for the sampling event from this database. Contact the database owner (analytical chemistry coordinator) for assistance.

Set up the sampler Ensure the sampler's calibration is current.

Set up the sampler unit so that the air inlet is free from obstructions. For most sampling, the sampler will run in a constant flow, where the sampler will run continuously and the samples will be collected as determined by the Air Monitoring Project Leader. If using the directional sampler, orient the intake in the direction of the source or as indicated by the Air Monitoring Project Leader.

Steps to set up the CF-1000BRL To set up the CF-1000BRL for a sampling job, perform the following steps:

Setting up the sampler, continued

Step	Action
1	Set up tripod, extend legs to maximum height. Be sure to set firmly in the ground or use sand bags to secure it.
2	Remove the wing nut from fixed bolt located on the bottom of the CF-1000BRL. Place the sampler on the tripod and replace wing nut, tighten firmly.
3	Attach the filter holder by threading it on to the sampler.
4	Loosen the four corner knurled nuts from the filter holder. Remove the top half of the filter holder.
5	Place filter on to holder and reinstall the top half of the filter holder. Tighten the four knurled nuts firmly (do not over-tighten.)
6	Connect sampler to GFCI-equipped power source or use a GFCI extension cord. Double check connections before energizing equipment. Use only "W"(wet) rated extension cords.
7	Mark the location of the extension cord with cones or similar marking so its location is visible to others (e.g., personnel mowing grass).
8	Turn the power switch on.
9	Adjust the flow rate control knob to 40 cfm.
10	Reset the sample timer to begin sample.
11	Record necessary start information on the chain-of-custody form.
12	For TSP sampling under the NonRadNET air sampling program, keep the zip-lock bag with the filter inside the TEOM unit until the end of the sampling period.

Steps to collect filters

To collect filters after a sampling period, perform the following steps:

Step	Action
1	When sample time is complete, record the final timer reading and final flow rate readings (on samplers so equipped) on the chain-of-custody form.
2	Turn off the sampler and unplug the power cord
3	Take the cassette to a place of relative protection from further dust contamination.
4	Complete the chain-of-custody form to document the sample collection.
5	Remove the cover, separate the cassette halves, and carefully remove the filter.
6	Remove filter and place it in its properly identified poly bag.
7	Coil up the extension cord and place it under or inside the sampler.

Setting up the sampler, continued

Submitting sample for analysis

Follow the instructions of the Air Monitoring Project Leader for submitting the collected filter samples. Include the c-of-c form with the sample and keep a copy in the “AIRNET Special Studies Field Data Validation And Verification Notebook”.

Maintenance

The CF-1000BRL High Flow Sampler and the Hi-Q TSP Sampler are maintenance-free.

Calibration

Re-calibrating the sampler Before each use, ensure the sampler has been calibrated within the past year. If not, follow the steps below to calibrate the sampler.

Steps to calibrate the CF-1000BRL

To calibrate the sampler, perform the following steps:

Step	Action
1	Install filter media, new filter holder, and filter holder adapter into the pump intake. IMPORTANT: Ensure you are using the same filter media as will be used for sample collection.
2	Connect Hi-Q air flow calibrator to the filter holder adapter.
3	Unplug power cord from outlet.
4	If adjustment is required, remove the front panel screws and separate the front panel from the housing to expose the rotameter needle valve which has a red dust cover over it. Remove the dust cover.
5	Support the face panel securely in a vertical position for proper operation of the rotameter.
6	Plug in power and turn on power.
7	Adjust flow rate for a calibrator flow rate at the normal operating rate.
8	Read the flow rate on the rotameter. It should be the same as the calibrator flow rate within 5% full scale. If not: Re-calibrate flow meter by adjusting the small brass needle valve located near the top of the rotameter. Adjust until the rotameter indicates the same flow rate as the calibrator. If matching the flow rate is not possible it may be necessary to re-mark the existing scale or purchase a blank scale and re-mark it.
9	Record the calibration work in the logbook.

Steps to calibrate the Hi-Q TSP

To calibrate the Hi-Q TSP sampler, perform the following steps:

Step	Action
1	Install filter media, new filter holder, and filter holder adapter into the pump intake. IMPORTANT: Ensure you are using the same filter media as will be used for sample collection.
2	Connect Hi-Q HFC-50C air flow calibrator to the filter holder adapter.
3	Turn on the unit and adjust the flow rates over the entire range. If the unit is in calibration, the rotometer reading will match the air flow calibrator.

Steps continued on next page.

Calibration, continued

Step	Action
4	If the rotometer does not match the reading, then set the motor speed up to a high flow rate and, with a small screwdriver, turn the brass needle valve on top of the rotometer one way or the other till the reading matches the calibrator.
5	Record the calibration work in the logbook.

Analyzing filters

Sending filters for analysis For some programs, filters are mailed to the State Health Department Scientific Laboratory Division. For the NonRad air program, filters are sent to the analytical laboratory where other AIRNET filters are sent.

State Scientific Laboratory For filters to be analyzed by the State Health Department Scientific Laboratory Division, place the glassine envelope containing the exposed quartz filter from the PM-10 Sampler and the Scientific Laboratory Division Heavy Metal Analytical Request Form (Attachment 2) into one of the smaller sized brown envelopes (see “Equipment needed” on page 9). Record the information asked for on the stamping. Mail to 700 Camino de Salud, Albuquerque, NM, 87106.

AIRNET analytical laboratory For the NonRad air monitoring program, send filters to the same lab as used for AIRNET filters (see group chemistry coordinator).

Records resulting from this procedure

Records

The following records are generated as a result of this procedure:

- entries in HiVol Sampler logbook (logbook will be submitted according to MAQ-011)
- chain-of-custody form for sample (shipped with sample and returned with sample results; copy in “AIRNET Special Studies Field Data Validation And Verification Notebook”)

HAZARD CONTROL PLAN

1. The work to be performed is described in this procedure.

“Air Sampling Using The High Volume Samplers”

2. Describe potential hazards associated with the work (use continuation page if needed).

Handling heavy objects (loading/unloading/transporting/positioning) – awkward equipment is hard to handle.
Falls/tripping
Animal Injuries (snakes, spiders, mountain lions, etc.,)
Weather (lightning)
High Explosives testing in areas such as TA-15, TA-16, TA-49, etc.
Radiation Areas in areas such as TA-54- Area-G, TA-16, etc.
Electrical shock in wet conditions
Electrical shock from damaged electrical conduit or extension cord via vehicle (e.g., mower) or animal damage.
Dropping materials on feet

3. For each hazard, list the likelihood and severity, and the resulting initial risk level (before any work controls are applied, as determined according to LIR300-00-01, section 7.2)

Handling heavy objects -- Moderate/occasional = low
Falls/Tripping – Moderate/Occasional = Low
Animal Injuries – Critical/Remote = Minimal
Weather -- Catastrophic/Remote = Low
High Explosives testing Areas -- Critical/Remote = Minimal
Radiation areas -- Negligible/Remote = Minimal.
Electrical shock in wet conditions -- Catastrophic/Remote = Low
Electrical shock from damaged electrical conduit — Critical/ Improbable= Low
Dropping materials onto feet -- Critical/Improbable = Low

Overall *initial* risk: ☐ Minimal ☒ Low ☐ Medium ☐ High

4. Applicable Laboratory, facility, or activity operational requirements directly related to the work:

☐ None ☒ List: Work Permits required? ☒ No ☐ List:

LIR-402-706-01 “Personnel Dosimetry”
LIR-402-718-01 “Radiological Training”
Access Control Requirements for applicable areas or FMUs
29CFR1926.500, Subpart M, Section 502, “Fall protection”
National Fire Protection Code—for use of electrical GCFIs
LIR 402-600-01 "Electrical Safety" for all electrical hazards
LIR402-10-01A “Lightning Safety”

HAZARD CONTROL PLAN, continued

5. Describe how the hazards listed above will be mitigated (e.g., safety equipment, administrative controls, etc.):

Handling heavy objects: -- training in proper lifting techniques.

Falls/tripping -- the MAQ Employee Orientation includes training and awareness of tripping and falls.

Animal Injuries -- same as above.

Lightning -- same as above.

Entry into High Explosives testing areas -- existing controls are stringent and not easily bypassed.

Existing facility controls include site-specific training, sign-in/sign-out, and scheduling procedures.

Entry into posted Radiation/Controlled areas -- Area-G and TA-15 controls are stringent and not easily bypassed.

Electrical shock in wet conditions -- Only use extension cords with GFCI or GFCI-equipped circuits, mark location of extension cords.

Electrical shock from damaged electrical conduit -- the administrative control requires that JCI be contacted to shut power off prior to any further work. Do not approach the unit if there is any obvious damage and where there could be a potential for electrical shock.

Dropping materials onto feet -- Steel-toed shoes or boots are required anytime pumps, station houses, timbers, or other heavy equipment is moved.

6. Knowledge, skills, abilities, and training necessary to safely perform this work (check one or both):



Group-level orientation (per MAQ-032) and training to this procedure.



Other → See training prerequisites on procedure page 3. Any additional describe here:

7. Any wastes and/or residual materials? (check one) ☒ None ☐ List:
None.

8. Considering the administrative and engineering controls to be used, the *residual* risk level (as determined according to LIR300-00-01, section 7.3.3) is (check one):



Minimal



Low



Medium (requires approval by Division Director)

9. Emergency actions to take in event of control failures or abnormal operation (check one):



None



List:

For any injury, provide first aid and see that injured person is taken to Occupational Medicine (if injury does NOT require immediate medical attention) or the hospital. For any exposed, energized electrical wires, contact JCNNM or the appropriate authority to turn off the power. Follow all site-specific emergency plans for any radiation or explosives emergencies.

Signature of preparer of this HCP: This HCP was prepared by a knowledgeable individual and reviewed in accordance with requirements in LIR 300-00-01 and LIR 300-00-02.

Preparer(s) signature(s)

Name(s) (print)

/Position

Date

Signature by group leader on procedure title page signifies authorization to perform work for personnel properly trained to this procedure. This authorization will be renewed annually and documented in MAQ records.

Controlled copies are considered authorized. Work will be performed to controlled copies only. This plan and procedure will be revised according to MAQ-022 and distributed according to MAQ-030.